

Ornithology

Chapter Objectives: *This chapter should expand your understanding of the following concepts.*

- **Adaptations**—flight and environmental adaptations, bill morphology
- **Migration**—using visual and olfactory cues, the sun, stars, magnetic field, and polarized light to guide migration
- **Bird intelligence**—reasoning, imagination, and prospection
- **Avian conservation**—habitat loss, spread of invasive species, environmental contamination, conservation organizations, and conservation success stories
- **Threatened and endangered species**—definition of terms, species lists
- **Identifying birds and bird songs**—birdwatching and identification by songs

These amazing feathered creatures that have often been so eloquently described permeate all aspects of our environment and culture. Birds are often the animals with which the general public has the most interaction, whether it is backyard feeding or the annoyance of raucous, pre-dawn American Crow calls. In Kansas, over 350 bird species occur each year. Many are migratory. Kansas serves as a “stopover” site for many birds on their long journey from Central and South America to locations north, for some all the way to the Arctic. Because of the great diversity of birds, and the amazing annual migration, birdwatching has become the second most common pastime in the United States. About 51 million Americans watch birds, and 12+ billion dollars are spent a year feeding wild birds.

Worldwide, over 10,000 species of birds are known (10,403 at last count), representing 29 orders, 187 families, and over 2,000 genera. Birds live in every environment, from Antarctica (King Penguins), to the Sahara Desert (Houbara Bustards), to the wheat fields in Kansas (Dickcissels). Birds are capable of extraordinary feats of endurance. Common Terns can migrate 20,000 miles in a year, and small hummingbirds travel nonstop across the Gulf of Mexico. New evidence also shows that birds sense the world differently than mammals. Birds can see in the UV-light range and detect magnetic forces, which they use to navigate during migration. As you delve into the avian world as a Master Naturalist, you may grow in your appreciation of birds and reflect on the words: A bird is a “truly awesome enigma.”

Adaptations

Flight Adaptations

One of the unique aspects of birds is their ability to fly. Most birds have specialized adaptations for flight. Flight requires the combination of being light enough to achieve flight and durable enough to absorb the punishment of flight, such as hard landings and wind gusts. To achieve this, birds have hollow bones that reduce their weight. They also have a marked degree of loss and fusion of bones that provide rigidity during flight. Birds must also be able to achieve very fast flight to escape predators but must be able to fly for hours at a time during migration. In order to achieve these seemingly contradictory needs of having quick reflexes, fast movements, yet enormous endurance, they have increased metabolisms. These metabolisms demand high rates of energy and oxygen delivery, as well as rapid removal of waste products. Rather than just the lungs that mammals have, birds have lungs and air sacs that allow relatively more maximum exchange of gases. A bird’s heart is about 40% larger than that of a mammal of similar size, and birds have very high blood pressure. Finally, the excretory system of birds is highly efficient, an adaptation for flight and high metabolic rates. The passage of food through the digestive tract from the esophagus and out the cloaca is rapid and varies from less than half an hour for fruit and berries to half a day for more difficult to digest foods.

This chapter adapted from the Illinois Master Naturalists handbook with kind permission of the author, Michael P. Ward. Adapted for Kansas by Chuck Otte, K-State Research and Extension, Geary County, Extension Agent, Ag & Natural Resources. Bird photos courtesy Bob Gress and Judd Patterson.

The extremely high metabolic rates of birds require large amounts of food. For example, birds consume 20 to 30 times as much food as does a reptile of the same size!

Environmental Adaptations

Environmental adaptations range from penguins' adaptation to extreme temperatures and whose wings have evolved into structures that enable them to be efficient swimmers, to the Sooty Tern, which leaves its nesting grounds as a youngster and remains aloft for 3 to 10 years, settling on water from time to time, and returning to land only to breed. Most species fall between these two extremes. Songbirds (passerines) tend to live in the branches of trees, some nesting on the branches, others in tree cavities. Waterfowl spend most of their time in the water and nest on shore, on floating mats of vegetation, or in tree cavities. In Kansas, extremes in niche use vary from longspurs that burrow into the snow in winter for warmth to Common Nighthawks, which return in early summer and frequently nest on flat-topped roofs that are often in excess of 100°F.

Bill Morphology

The great diversity in bill morphology illustrates the variety of foods that birds consume. Different species can be herbivores, carnivores, or omnivores. Their diets include seeds, fruits, nectar, buds, invertebrates of various sizes, and some vertebrates, including carrion. The majority of birds—especially songbirds—consume fruits, seeds, and insects. Very few birds are strictly herbivores. The complex digestive tracts required to process



Rufous Hummingbird

green leaves and the weight of the slowly digesting plant matter limits flying ability. A bird's bill is its principal adaptation to diet. The size, shape, and strength of bird bills are designed to manipulate different types of food. Nectar feeders, such as hummingbirds, have long thin bills and tube-shaped tongue tips that draw up nectar. The carnivores have strong, hooked beaks to tear flesh. Some piscivores (fish eaters) have long, straight, sharply pointed bills that are designed to catch and carry fish. Woodpeckers have chisel-like bills that dig into wood to reach insects. The varied lengths and curvatures of the bills of shorebirds are adapted to the type of prey they catch. Seed eaters have short, stout, strong bills that crack open seeds. Some ducks have broad flat bills to filter plankton and duckweed from the water.



Black-crowned Night-Heron

Migration

One of the most energetically costly and most spectacular events that some birds undertake is migration—the seasonal or periodic movement of individuals between their breeding and nonbreeding grounds. Seasonal climate cycles and food availability are often responsible for this phenomenon. The scale of migration can range from local migrations—as in some tropical species that migrate up and down mountain slopes—to a global scale across and between continents. Some birds travel as far as 7,400 miles. The primary migration routes of North American land birds are oriented north-south, particularly because the wintering ranges of most species are south of the breeding ranges and also because mountain ranges and river valleys trend north-south.

Birds migrate at the time of day and the heights that are the safest, fastest, and require the least energy. Therefore, many birds migrate at night. Some exceptions are hawks, which migrate during the day, when they are able to take advantage of the thermal air currents. Swifts and swallows also migrate during the day, as they feed on the wing and need to see their insect prey. However, most species migrate at night, when they are least likely to be preyed upon by hawks. Nighttime migration allows birds to feed and refuel during the day.

Additionally, cooler nighttime temperatures allow more efficient dissipation of body heat.

Over 200 species that breed in North America migrate to Latin America to spend the winter. Many species engage in amazing feats of endurance—a snapshot of which can be viewed at many habitats in Kansas. One example is the blackpoll warbler. This small, 10- to 20-gram bird sometimes migrates continuously for 80 to 90 hours. This feat is the metabolic equivalent of a human running a 4-minute mile for 80 hours! There is another way of comparing this feat: If a blackpoll warbler were burning gasoline instead of body fat, it would be getting 720,000 miles to the gallon.

Another example is the American Golden Plover, a species that forages in wet agricultural fields in late March to early April while on its yearly journey from Brazil to the Arctic Circle. The fields and pastures of central Kansas provide an important stopover area for these individuals as they refuel for the final leg of their journey.



American Golden-Plover

These feats of endurance are rivaled by the ability of birds to return to the exact same tree, clump of grass, or lamp post to breed year after year. It is likely that, if an Eastern Phoebe

bred in your backyard one year, it might spend the winter in central Mexico and then return to your yard the next spring. Homing pigeons can find their way home from areas as far as 500 miles away. Birds transplanted from California to New Jersey found their way back to California. How do they do this? The answer is that they have several overlapping and redundant systems that allow them to navigate.

The presently known list of the cues they use include:

Visual Cues—Birds use coastlines, mountains, rivers, etc. to navigate. Studies that have put frosted contact lens on homing pigeons find that they have problems finding their way home. But they generally make it back.

Olfactory Cues—Although birds have a relatively poor sense of smell, some species that nest in large colonies use scent to locate their nests. Other recent research suggests homing pigeons use smells to find their way home.

Sun—Birds are able to orient themselves based on the sun's movement across the sky. And in some sense, they tell time by compensating for the changes in the sun's location over the course of the day and in different seasons.

Stars—Early research on the navigation of birds demonstrated that birds use the stars. Indigo buntings raised in a planetarium would go north in spring and south in fall. However, if the planetarium was turned off, the birds were disoriented. If the "sky" was reversed, the birds flew south in the spring and north in the fall. Indigo buntings appear to use star patterns of constellations, because their direction was not affected if just one or two stars (for example, the North Star) were turned off.

Earth's Magnetic Field—For years, ornithologists were skeptical that birds could use the Earth's magnetic forces. Definitive proof was provided by a test that used the Helmholtz cap. This cap is a small hat put on the head of a bird that changes the bird's magnetic field experience in a known manner. Early tests on homing pigeons demonstrated that on sunny days birds found their way home regardless of whether or not they wore a cap. However, on cloudy days, pigeons without Helmholtz caps found their way home, while ones with the caps did not. These experiments suggest that on

sunny days, the pigeons relied on the sun. However, when the sun was obscured, the pigeons used the magnetic field of the Earth. Several other more recent tests have confirmed that birds do sense and use magnetic fields.

Polarized Light—At sunset and sunrise, birds are able to view polarized light emitted from the sun. Recent research suggests they can use these predictable sources of light to reset their internal compasses. In general, most research suggests birds do not rely on one single cue to navigate but rather use all of the cues. For a species such as the Swainson’s Thrush—a common migrant in Kansas—18 night flights are needed to migrate from Panama to Canada. Over the 18 nights, they are likely to experience cloudy periods and other events that require them to use different cues over the course of their journey.

Bird Intelligence

“Bird Brain”

The phrase “bird brain” has come to be a pejorative term referring to intelligence. In the past, neurophysiologists thought of bird brains as primitive. However, recent research suggests otherwise. Even though the corresponding portions of a human’s brain that are responsible for higher learning are greatly reduced in a bird’s brain, other portions of the brain not responsible for higher learning in humans are responsible for higher learning in birds. Birds are capable of casual reasoning, imagination, and prospecting. Today, birds are generally thought to be much more intelligent than previously thought, and many researchers are currently attempting to determine the limits of their intelligence.

Examples of Avian Intelligence

- Monkeys require 21,000 trials before they can learn to count, rats never learn to count, but ravens learn very quickly.
- Chinese fishermen who allowed cormorants to eat every eighth fish they caught found that once their quota of seven fish was filled, the birds “stubbornly refused to move again until their neck ring was loosened. They ignored an order to dive and even resisted a rough push or a knock, sat

glum and motionless on their perches.... Meanwhile, other birds that had not filled their quotas continued to catch fish as usual,” suggesting these birds can count up to seven.

- Pigeons can memorize up to 725 different visual patterns, learn to categorize objects as “human-made” vs. “natural,” and communicate using visual symbols.
- New Caledonian Crows can make tools out of leaves or novel human-made materials, use these tools to retrieve food, and are thought to pass this knowledge on to other crows through social learning. New Caledonian Crows have also been observed to use human behavior to solve problems. These crows dropped seeds that were too hard for them to crack at stoplights when the light was red. They then waited for the light to turn green and then red again so that they could eat the fruit out of the seeds that had been crushed by cars.
- Harris’s Hawks work in teams to hunt. Their cooperative hunting improves the probability of catching prey and lowers the individual energy costs relative to that of hunting alone. Some of the hawks flush rabbits or other prey out of cover into an area where other hawks are waiting to make the kill.
- Birds such as chickadees, nuthatches, and jays that cache (store) seeds have tremendous spatial memories. Clark’s Nutcrackers can cache 33,000 seeds and retrieve them up to 9 months later! Their caches may be miles apart, and they use several landmarks to find old caches.
- Scrub Jays exhibit episodic memory and are able to recall events that took place at a specific time or place.

Avian Conservation

Birds have huge public appeal and are often used as the “poster child” of conservation efforts. Over the last century in Kansas, a couple of bird species have become extinct; and there are dozens of species whose populations have

declined precipitously. The goal of bird conservation is to stabilize or increase bird populations and to prevent extinctions. Sound management of healthy populations can preempt future costly rescue efforts. History reminds us not to take even the most common birds for granted. For example, the Passenger Pigeon population was estimated at 2 billion individuals; but over the course of a century, the species became extinct due to over-hunting and habitat loss. The factors responsible for most avian population declines can be roughly divided into three categories: habitat loss, invasive species spread, and environmental contamination.

Habitat Loss

Habitat loss is regarded as the largest threat to bird populations and is most often attributed to expanding human populations. In Kansas, over 50% of grassland and wetland habitats have been lost. However, habitat loss is not merely the direct loss of breeding habitat. Loss can also result in the remaining habitat being of lower quality. This “fragmentation” of habitat is common in Kansas and often leads to habitats where birds have difficulty successfully reproducing. One of the challenges birds face is the creation of large amounts of edge habitat that harbors high densities of nest predators. Raccoons, skunks, opossums, snakes, and Brown-headed Cowbirds all thrive in edge habitats and have a significant impact on nesting success. The mammals and snakes are nest predators, while cowbirds are a brood parasite that lays eggs in other birds’ nests.



Brown-headed Cowbird

Invasive Species Spread

Invasive species—whether they are birds, plants, snakes, or mammals—can have a dramatic impact on bird populations. In urban areas, nonnative species such as House Sparrows and European Starlings have a negative impact on the native, cavity-nesting species. Because European Starlings and House Sparrows are more aggressive, they can exclude native species such as Cliff Swallows, Eastern Bluebirds, Red-headed Woodpeckers, and Black-capped Chickadees from nest cavities.

Invasive plants can also have a negative effect on bird populations. Some invasive plants change the structure of habitats, resulting in habitat loss. For example, in Kansas, garlic mustard, invasive bush honeysuckle, and sericea lespedeza all change habitat composition and therefore prevent ground-nesting birds from breeding.

One of the more recent discoveries is that snakes are a far more important nest predator than previously thought. Research using miniature cameras in shrublands, forest edges, and grasslands has documented that, in some instances, snakes cause over half of the nest-predation events.

Invasive mammals also have a significant negative effect on bird populations. For example, cats—whether feral or domestic—kill a large number of birds. By some accounts, cats kill 4 billion creatures a year, many of them birds, in North America. Because of this large impact, there are now several programs geared toward educating people about the harm that cats can do and urging all cat owners to keep their cats indoors. Rats, particularly on islands, can destroy large numbers of bird nests. Although raccoons are a native species, the creation of large amounts of edge habitat results in unprecedented densities of raccoons. In some areas raccoons are suggested to be the reason for steep declines in forest-bird species such as Wood Thrushes, Field Sparrows, and Kentucky Warblers.

Environmental Contamination

Environmental contaminants can have equally devastating effects as habitat loss, although the effect often goes unnoticed until large population declines are detected or a large

die-off of a particular species at a specific location is observed. An example of a pronounced effect on bird populations from an environmental contaminant is DDT. Before DDT was banned in the United States, it was commonly applied to the landscape—and in some cases onto people—to control mosquitoes. DDT worked remarkably well in killing mosquitoes. However, DDT caused many birds' eggshells to become very fragile; and many raptors, including bald eagles and peregrine falcons, experienced large population declines. The eggshells were so fragile that the parent would inadvertently crack the egg while incubating it. Since the ban on DDT in the United States, many species have experienced remarkable recoveries. In Kansas, Bald Eagles, and Peregrine Falcons are breeding successfully in the state once again.

Conservation Organizations in Kansas

There are a number of organizations that work together for bird conservation. Many are government agencies, such as the Kansas Department of Wildlife, Parks, and Tourism, and the U.S. Fish and Wildlife Service. Other organizations such as Kansas Audubon, Ducks Unlimited, Pheasants Forever, Quail Unlimited, National Wild Turkey Federation, and The Nature Conservancy, just to name a few, provide information, purchase habitat, and cooperate to develop more comprehensive plans to protect and restore birds. Because of the hard work of these organizations, there are success stories. Although in some cases, successes may not be realized in terms of increasing populations, actions by these groups prevented further population declines.

- The wood duck, once over-hunted for its beautiful plumage, is once again a fairly common breeding duck in Kansas.
- Bald Eagles populations are currently rebounding in Kansas. This species was absent as a breeding species from Kansas for over a century; but over the last 25 years, the breeding population has been increasing at a steady rate such that in 2015 there were over 90 active nests in the state.
- Peregrine falcons virtually disappeared in the 1960s due to DDT. A ban was placed on DDT in the United States. Peregrine Falcon populations

are now rebounding and a pair routinely nests in downtown Topeka.



Peregrine Falcon

Threatened and Endangered Birds of Kansas

Because of the great concern over the decline of many bird species, the State of Kansas and the federal government have enacted laws and regulations to protect specific species whose population trends suggests that, without action, the species will become extinct. In Kansas, endangered species means any species of wildlife whose continued existence as a viable component of the state's wild fauna is determined to be in jeopardy. A state threatened species means any species of wildlife which appears likely, within the foreseeable future, to become an endangered species.

The major reason for these declining populations is the loss of suitable breeding habitat. Since the early 1800's, Kansas has lost about half of its wetlands and two thirds of its native prairie. While that seems like a lot, Kansas has fared better than many other states that have lost as much as 90% or more of both of these critical ecosystems. Many authorities feel that wetland and grassland nesting species are at greater risk than other species because of this loss of critical breeding habitat.

State and federally listed species are protected in Kansas as designated by the *Kansas Nongame and Endangered Species Conservation Act* of 1975. The act places the responsibility for identifying and undertaking appropriate conservation measures for listed species directly upon the Department of Wildlife, Parks and Tourism through statutes and regulations.

Regulations require the department to issue special action permits for activities that affect species listed as threatened and endangered in Kansas. Department personnel conduct environmental reviews of these proposed activities, and if necessary issue action permits with special conditions that help offset negative effects to listed species and critical habitats.

Threatened Species

Lesser Prairie-Chicken *Tympanuchus pallidicinctus**

Snowy Plover *Charadrius nivosus*

Piping Plover *Charadrius melodus**

Red Knot *Calidris canutus rufa**

Endangered Species

Whooping Crane *Grus americana***

Least Tern *Sterna antillarum***

* Federally threatened species

** Federally endangered species



Whooping Crane

Kansas also has a classification known as Species in Need of Conservation (SINC). By definition this is any nongame species deemed to require conservation measures in attempt to keep the species from becoming a threatened or endangered species.

SINC Species

Ferruginous Hawk, *Buteo regalis*

Golden Eagle, *Aquila chrysaetos*

Black Rail, *Laterallus jamaicensis*

Mountain Plover, *Charadrius montanus*

Long-billed Curlew, *Numenius americanus*

Black Tern, *Chlidonias niger*

Short-eared Owl, *Asio flammeus*

Eastern Whip-poor-will, *Antrostomas vociferus*
 Ladder-backed Woodpecker, *Picoides scalaris*
 Chihuahuan Raven, *Corvus cryptoleucus*
 Curve-billed Thrasher, *Toxostoma curvirostre*
 Cerulean Warbler, *Setophaga cerulean*
 Yellow-throated Warbler, *Setophaga dominica*
 Henslow's Sparrow, *Ammodramus henslowii*
 Bobolink, *Dolichonyx oryzivorus*

Identifying Birds and Bird Songs

Birdwatching

Birdwatching is one of the most common and quickly growing hobbies in North America. Almost anywhere in Kansas, groups or societies gather to watch birds. The Kansas Ornithological Society and the Kansas Audubon Society are two statewide organizations; but a number of other bird oriented groups are active elsewhere in the state, especially in the larger metro areas. Birdwatching provides the opportunity to regularly identify different species. In Kansas, over 350 species are observed annually; and in the United States, as many as 800 species can be seen. With such diversity, and the migratory aspect of birds, birdwatching offers a great opportunity to continually learn about bird behavior.

Birds can be identified by appearance and song. The best way to begin to learn how to identify birds is simply to take walks in nature. When you notice a bird, record the field marks (for example, yellow breast, white eye-ring, etc.) that you observe. Important field marks include size, shape, and color of birds, as well as the shape of the bill, whether the wings have bars on them, and the pattern on the head. The behavior can also be important in identification (for example, bobbing the head, hovering in flight, etc.). Many other field marks are sometimes needed to differentiate between species. Buy a good field guide and use this resource to determine what species you observe. In order to most readily observe birds, you will need a good pair of binoculars. One of the best ways to improve identification skills quickly is to accompany accomplished birders. There are several birding groups in Kansas, all of which welcome novice birders.

As a new birder, you will need these resources because, within a species, males may look different than females; and young birds may look different than adults. This diversity is both good and bad. It is good because no matter how much time is spent in the field, new species or subspecies can always be located. However, the large number of species can be daunting for the novice. To this end, novice birdwatchers should start with the common species. Becoming familiar with common species allows you to locate an uncommon species more quickly and also provides a point of reference for other species. For example, downy woodpeckers are rather common, while hairy woodpeckers are less common. The easiest way to identify a Hairy Woodpecker is to note that it looks much like a downy woodpecker but is larger with a longer bill.

Becoming familiar with common species also sharpens your observational skills. The more you look at birds, the more you will naturally look for subtle field marks. For example, when a new birder observes a sparrow, he or she may notice a small brown bird with streaking and stripes on the head. This observation tells you it is a sparrow but not what species of sparrow. Once you become familiar with sparrows, you will identify a sparrow with white outer-tail feathers as a Vesper Sparrow, or you may note that a sparrow with a small yellow spot near the eye is a Savannah Sparrow, as opposed to the similar Song Sparrow.

Some species are very similar in appearance, so it is important to be familiar with the range of a species. For example, Tricolored Blackbirds are similar in appearance to Red-winged Blackbirds; however, Tricolored Blackbirds occur only in the Pacific Coast states, while Red-winged Blackbirds are one of the most common species in Kansas. Therefore, although the bird may appear to be more similar to the illustration or photo of a Tricolored Blackbird in a field guide, if in Kansas, you will know that it is a Red-winged Blackbird.



Red-winged Blackbird

Bird Songs

Identifying birds by appearance is a handy skill to have, but you don't always get the opportunity to see the birds. You may only hear their songs or vocalizations. Many people find that learning the songs of birds is more difficult than being able to identify the birds by appearance. This is because many species give several different songs and calls. Although there are several good bird song CDs—and these are an excellent resource—time in the field listening to birds singing is probably the best way to learn bird vocalizations. Matching an observed bird with its song or call while it is singing can often be the best way to remember the songs and calls. Whether you are using a CD, MP3 player or an app on your phone, great care needs to be taken when using recordings of bird calls around birds, especially in the breeding season. Some species are very sensitive to calls and may abandon a nest site due to repeated playback of their song.

Smart Phone/Tablet Apps for Birds

There are numerous applications for smart phones and tablets that should be considered if you are interested in birds. While perhaps not as useful as a good field guide, they provide a very handy way of always having a “bird book” with you wherever you go. Like field guides they have illustrations or photos of birds, descriptions of the species and range maps showing when and where they may be found. In addition to all these items the apps have the added bonus of having bird calls and vocalizations available at your fingertips.

Some of the more popular smart phone/tablet apps are:

- The Sibley eGuide to the Birds of North America
- Peterson Field Guides to Birds of North America
- Audubon Birds A Field Guide to North American Birds
- National Geographic Birds: Field Guide to North America
- iBird Pro: Interactive Field Guide to Birds of North American and Hawaii
- The Warbler Guide

Suggested Readings and Resources

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Clark, W.S., and B.K. Wheeler. 2001. *A Field Guide to Hawks of North America*. Houghton Mifflin Company, New York, New York.

Cornell Lab of Ornithology
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KSBIRD-L: An internet based discussion group (ListServ) focusing on birds of Kansas:
<http://listserv.ksu.edu/archives/ksbird-l.html>

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Glossary

Bill morphology: The size, shape, and strength of a bird's bill. Bird bills are designed to manipulate different types of food.

Brood parasite: Birds that lay their eggs in the nests of other birds instead of building a nest and caring for their young themselves. There are two types of brood parasitism—intraspecific (same species) and interspecific (different species). For example, many species of ducks are intraspecific brood parasites. The Brown-headed Cowbird is a well-known interspecific parasite.

Cavity nesters: Birds that nest in holes in dead or deteriorating trees. About 85 species of North American birds are considered to be cavity nesters. When natural cavities are not available, some nest in human-made bird boxes. The Eastern Bluebird and Wood Duck are examples of cavity nesters that breed in Kansas.

Endangered: A species that is in danger of extinction as a breeding species.

Field marks: Characteristics specific to species that aid in their identification. Some examples of field marks are tail patterns, rump patches, eye-stripes or eye-rings, and wing bars.

Migration: The seasonal or periodic movement of individuals between the breeding and nonbreeding grounds.

Native: A species that occurs naturally and is adapted to a particular area or region.

Nest predation: Loss of eggs or young to predators. Common nest predators include

raccoons, opossums, snakes, crows, and Blue Jays.

Passerine: Birds in the order Passeriformes. They are commonly known as perching birds.

Prospection: The ability to imagine possible future events. An example would be jays' caching food for later use.

Threatened: A species that is likely to become an endangered species within the foreseeable future.

Waterfowl: Birds in the order Anseriformes. This order includes ducks, geese, and swans.

Suggested Activities

Activity 1:

Feed and Observe Birds

Feed birds year-round at a location where you can observe and identify various species. Keep a daily record of the species and relative numbers that you see. Can you determine the food preferences of individual bird species?

Activity 2:

Monitor Bird Migration

Pick an accessible area that migrating birds visit. Monitor a woodland, a wetland, or maybe even your own backyard if it provides suitable habitat. In both spring and fall, record all migrating species you can see on a daily basis and the dates that you see them.

Activity 3:

Study Kansas Ornithologists

Kansas is home to several ornithologists of note, including Francis Snow, Nathaniel Goss, Arthur Goodrich, Harrison Tordoff, and John Zimmerman. Investigate the very interesting lives of these persons and their fascination with birds. Give a report at a Master Naturalist meeting.

Activity 5:

Identify Bird Nests in Winter

Birds often nest right under our noses and go undetected in spring and summer. Discover their nests during the winter months and use clues such as locations, nest construction, and materials used to speculate about the species that nested here.

Activity 6:

Participate in a Bird Count

Contact the Kansas Ornithological Society, a local Audubon Chapter, or a local Nature Center to see which "official" bird counts they are conducting, such as the May migration or Christmas bird count. Participate and pair up with an experienced birder if you are a novice at identifying birds.

KANSAS BIRDS: Species List for Kansas

WHISTLING-DUCKS

- ___ Black-bellied Whistling-Duck
- ___ Fulvous Whistling-Duck

GEESE, SWANS

- ___ Greater White-fronted Goose
- ___ Snow Goose
- ___ Ross's Goose
- ___ Brant
- ___ Cackling Goose
- ___ Canada Goose
- ___ Trumpeter Swan
- ___ Tundra Swan

DUCKS

- ___ Wood Duck
- ___ Gadwall
- ___ [Eurasian Wigeon]†
- ___ American Wigeon
- ___ American Black Duck
- ___ Mallard
- ___ Mottled Duck
- ___ Blue-winged Teal
- ___ Cinnamon Teal
- ___ Northern Shoveler
- ___ Northern Pintail
- ___ Garganey†
- ___ Green-winged Teal
- ___ Canvasback
- ___ Redhead
- ___ Ring-necked Duck
- ___ [Tufted Duck]†
- ___ Greater Scaup
- ___ Lesser Scaup
- ___ King Eider†
- ___ Common Eider†
- ___ Harlequin Duck†
- ___ Surf Scoter
- ___ White-winged Scoter
- ___ Black Scoter
- ___ Long-tailed Duck
- ___ Bufflehead
- ___ Common Goldeneye
- ___ Barrow's Goldeneye
- ___ Hooded Merganser
- ___ Common Merganser
- ___ Red-breasted Merganser
- ___ Ruddy Duck

QUAIL

- ___ Scaled Quail
- ___ Northern Bobwhite

PHEASANT

- ___ Ring-necked Pheasant

GROUSE

- ___ Ruffed Grouse
- ___ Sharp-tailed Grouse
- ___ Greater Prairie-Chicken
- ___ Lesser Prairie-Chicken

TURKEY

- ___ Wild Turkey

LOONS

- ___ Red-throated Loon
- ___ Pacific Loon
- ___ Common Loon
- ___ Yellow-billed Loon†

GREBES

- ___ Pied-billed Grebe
- ___ Horned Grebe
- ___ Red-necked Grebe
- ___ Eared Grebe
- ___ Western Grebe
- ___ Clark's Grebe

FLAMINGOS

- ___ American Flamingo†

STORKS

- ___ Wood Stork

FRIGATEBIRDS

- ___ Magnificent Frigatebird†

CORMORANTS

- ___ Neotropic Cormorant
- ___ Double-crested Cormorant

DARTERS

- ___ Anhinga

PELICANS

- ___ American White Pelican
- ___ Brown Pelican

HERONS

- ___ American Bittern
- ___ Least Bittern
- ___ Great Blue Heron
- ___ Great Egret
- ___ Snowy Egret
- ___ Little Blue Heron
- ___ Tricolored Heron
- ___ Reddish Egret†
- ___ Cattle Egret
- ___ Green Heron
- ___ Black-crowned Night-Heron
- ___ Yellow-crowned Night-Heron

IBISES

- ___ White Ibis
- ___ Glossy Ibis
- ___ White-faced Ibis
- ___ Roseate Spoonbill

VULTURES

- ___ Black Vulture
- ___ Turkey Vulture

OSPREY, HAWKS, KITES,

EAGLES

- ___ Osprey
- ___ Swallow-tailed Kite
- ___ White-tailed Kite†

- ___ Mississippi Kite
- ___ Bald Eagle
- ___ Northern Harrier
- ___ Sharp-shinned Hawk
- ___ Cooper's Hawk
- ___ Northern Goshawk
- ___ Harris's Hawk†
- ___ Red-shouldered Hawk
- ___ Broad-winged Hawk
- ___ Gray Hawk†
- ___ Swainson's Hawk
- ___ Red-tailed Hawk
- ___ Ferruginous Hawk
- ___ Rough-legged Hawk
- ___ Golden Eagle

RAILS, GALLINULES

- ___ Yellow Rail
- ___ Black Rail
- ___ King Rail
- ___ Virginia Rail
- ___ Sora
- ___ Purple Gallinule
- ___ Common Gallinule
- ___ American Coot

CRANES

- ___ Sandhill Crane
- ___ Common Crane†
- ___ Whooping Crane

STILTS, AVOCETS

- ___ Black-necked Stilt
- ___ American Avocet

PLOVERS

- ___ Black-bellied Plover
- ___ American Golden-Plover
- ___ Snowy Plover
- ___ [Wilson's Plover]†
- ___ Semipalmated Plover
- ___ Piping Plover
- ___ Killdeer
- ___ Mountain Plover

SANDPIPERS

- ___ Spotted Sandpiper
- ___ Solitary Sandpiper
- ___ Spotted Redshank†
- ___ Greater Yellowlegs
- ___ Willet
- ___ Lesser Yellowlegs
- ___ Upland Sandpiper
- ___ Eskimo Curlew
- ___ Whimbrel
- ___ Long-billed Curlew
- ___ Hudsonian Godwit
- ___ Marbled Godwit
- ___ Ruddy Turnstone
- ___ Red Knot
- ___ Ruff

- ___ Rusty Blackbird
- ___ Brewer's Blackbird
- ___ Common Grackle
- ___ Great-tailed Grackle
- ___ Brown-headed Cowbird
- ___ Orchard Oriole
- ___ Hooded Oriole†
- ___ Bullock's Oriole
- ___ Baltimore Oriole
- ___ Scott's Oriole†

FINCHES

- ___ Brambling†
- ___ [Gray-crowned Rosy-Finch]†
- ___ Pine Grosbeak
- ___ House Finch
- ___ Purple Finch
- ___ Cassin's Finch
- ___ Red Crossbill
- ___ White-winged Crossbill
- ___ Common Redpoll
- ___ Pine Siskin
- ___ Lesser Goldfinch
- ___ American Goldfinch
- ___ Evening Grosbeak

OLD WORLD SPARROWS

- ___ House Sparrow

† Fewer than ten Kansas records

[] Hypothetical species

* Documented breeding species, meeting the requirements for a Probable or Confirmed Breeder as defined by the Kansas Breeding Bird Atlas Project.

This list was compiled from records of the Kansas Ornithological Society, Kansas Breeding Bird Atlas Project, and the Kansas Biological Survey.

February 1, 2016

Please report any birds not on this list to Max Thompson, Southwestern College, Dept of Biology, 100 College St., Winfield, KS 67156, maxt@cox.net

Rare birds noted with † should be reported to the Kansas Bird Records Committee (KBRC) care of Chuck Otte, 613 Tamerisk Dr., Junction City, KS 66441, otte2@cox.net

More information on reporting rare birds can be found at the KBRC home page on the Kansas Ornithological Society's Web site at: <http://ksbirds.org>

Please report additions or errors on this list to Chuck Otte, 613 Tamerisk Dr., Junction City, KS 66441 otte2@cox.net

476 species

Of the 479 species documented to have occurred in Kansas, three species are not including in this list because they no longer occur. The Passenger Pigeon and Carolina Parakeet are extinct, and the Gunnison Sage-Grouse has been extirpated from the state.

The taxonomic sequence and nomenclature used in this list follow the *Checklist of North American Birds*, 7th edition, American Ornithologists' Union, 1998, updated through the 56th Supplement, 2015, (*The Auk: Ornithological Advances* 132:748-764, 2015).